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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,807	07/09/2003	Vladimir M. Segal	50040030.20671	8639
62993	7590	11/15/2007	EXAMINER	
BUCHALTER NEMER 18400 VON KARMAN AVE. SUITE 800 IRVINE, CA 92612			WILKINS III, HARRY D	
		ART UNIT	PAPER NUMBER	
		1795		
		MAIL DATE	DELIVERY MODE	
		11/15/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/614,807	SEGAL ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	Harry D. Wilkins, III	1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 06 September 2007.  
 2a) This action is FINAL.      2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 16,19-39 and 110 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 16,19-39 and 110 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 09 July 2003 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____. _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Effective Filing Date***

1. The present application is a continuation-in-part of application 09/465,492. However, none of the presently pending claims are fully supported within the disclosure of that application. As such, the present claims are accorded an effective filing date of the day on which this application was filed, 9 July 2003. In particular, neither the hardness limitation of claims 16 or 110, nor the standard deviation limitation of claim 29, find support in the 09/465,492 application.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 16 and 19-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pavate et al (US 6,391,163) in view of Perry et al (US 6,896,748).

Pavate et al teach (see abstract and col. 3, lines 21-29) a copper alloy sputter target including 100 ppm-10 wt% of an alloying element such as Mg, Zn, Al, Fe, Ni or Si with a hardness of 100-250 HV (Vickers). Such a Vickers hardness equates to more than 40 on the Brinell hardness scale (HB).

However, Pavate et al do not teach the grain size of the copper sputtering target. Pavate et al does include a teaching regarding the grain size (see col. 2, lines 55-59, col. 3, lines 2-4 and col. 3, line 66 to col. 4, line 3), such that the grain size should be kept as small as possible to achieve better sputtering characteristics.

Perry et al teach (see abstract and col. 3, lines 42-46) a method of forming copper alloy sputtering targets that achieves grain sizes as small as 0.1  $\mu\text{m}$ .

Therefore, it would have been obvious to one of ordinary skill in the art to have used the process of Perry et al to make the sputtering targets of Pavate et al so that the sputtering targets of Pavate et al would have had as small a grain size as possible as suggested by Pavate et al.

Regarding claims 18-21, Perry et al teach (see col. 4, lines 8-18) that the process achieved a uniform microstructure throughout the target. Thus, one of ordinary skill in the art would have expected the resultant sputtering target to have had a uniform grain size (less than 10% standard deviation) and hardness (less than 3.5% standard deviation).

Regarding claim 22, Perry et al suggest (see col. 4, lines 43-60) that when the sputtering target had sufficient strength, it could be used as a monoblock with a backing plate.

Regarding claim 23, Pavate et al suggest using a backing plate. It would have been within the expected skill of a routineer in the art to have selected an appropriate backing plate attachment method, such as diffusion bonding with a bond yield strength of greater than about 15 ksi.

Regarding, claims 24-26, Pavate et al teach (see col. 2, lines 55-64) that the crystallographic orientation of the sputtering target was known to be a result effective variable. Therefore, it would have been obvious to one of ordinary skill in the art to have optimized the orientation of the sputtering target in order to achieve proper sputtering results.

Regarding claim 27, Pavate et al suggest Al, Zn or Mg.

Regarding claim 28, Pavate et al teach a preferred range of alloy additive of 0.01 wt% to 5 wt%.

5. Claims 29, 30 and 32-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perry et al (US 6,896,748).

Perry et al teach (see abstract, col. 2, lines 6-27 and col. 3, lines 25-46) a copper alloy sputtering target including less than 10 wt% alloying elements with an average grain size of from 0.1-7.5  $\mu\text{m}$ . Perry et al teach (see col. 4, lines 8-17) that the sputtering target has a uniform microstructure. Therefore, one of ordinary skill in the art would have found it obvious to have made the sputtering target with a grain size uniformity with a standard deviation of less than about 15% throughout the target.

It would have been obvious to one of ordinary skill in the art to have selected the alloying element from the list disclosed in claim 29.

Regarding claim 30, since the sputtering target of Perry et al had a uniform microstructure, one of ordinary skill in the art would have found it obvious to have made the sputtering target with a grain size uniformity with a standard deviation of less than about 10% throughout the target.

Regarding claim 32, since the sputtering target of Perry et al had a uniform microstructure, one of ordinary skill in the art would have found it obvious to have made the sputtering target with a hardness uniformity with a standard deviation of less than about 5% throughout the target.

Regarding claim 33, Perry et al suggest (see col. 4, lines 43-6) making the sputtering target as a monoblock.

Regarding claim 34, Perry et al admit that backing plates had been used. It would have been obvious to one of ordinary skill in the art to have used a backing plate with the sputtering target of Perry et al if more strength were desired in the sputtering target. It would have been within the expected skill of a routineer in the art to have selected an appropriate backing plate attachment method, such as diffusion bonding with a bond yield strength of greater than about 15 ksi.

Regarding claims 35-37, crystallographic orientation was known to be a result effective variable in the prior art (see Pavate et al (col. 2, lines 55-64)). Therefore, it would have been obvious to one of ordinary skill in the art to have optimized the orientation of the sputtering target in order to achieve proper sputtering results.

6. Claims 31, 38 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perry et al (US 6,896,748) in view of Pavate et al (US 6,391,163).

The teachings of Perry et al are described above.

Perry et al are silent with respect to the identity of the alloying element and the hardness of the resulting alloy.

Pavate et al teach (see abstract and col. 3, lines 21-29) a copper alloy sputter target including 100 ppm-10 wt% of an alloying element such as Mg, Zn, Al, Fe, Ni or Si with a hardness of 100-250 HV (Vickers). Such a Vickers hardness equates to more than 40 on the Brinell hardness scale (HB).

Therefore, it would have been obvious to one of ordinary skill in the art to have used Mg, Zn or Al as the alloying element in order to achieve the increased hardness of the sputtering target so that the resulting sputtering properties could be improved.

Regarding claim 39, Pavate et al teach a preferred range of alloy additive of 0.01 wt% to 5 wt%.

7. Claim 110 is rejected under 35 U.S.C. 103(a) as being unpatentable over Perry et al (US 6,896,748) in view of Nagano et al (US 2001/0035238) and Pavate et al (US 6,391,163).

The teachings of Perry et al are described above.

Perry et al are silent with respect to the identity of the alloying element and the hardness of the resulting alloy.

Nagano et al teach (see abstract and paragraphs 5-8 and 21-28) a copper sputtering target including 0.001-1.0 at% additions of various alloying elements to improve the thermal stability and to refine the grain structure. Nagano et al disclose (in paragraph 27) a laundry list of suitable alloying elements that improved the

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electromigration resistance and/or thermal stability which included Cd, Ca, Au, Ag, Be, In, B, Ga, Mn, Sn, W, Cr, Co, Te, Ti, Zr, Sc, Pt, Nb, Re, Mo and Hf.

Therefore, it would have been obvious to one of ordinary skill in the art to have used one of the disclosed elements as the alloying element as suggested by Nagano et al in order to achieve a sputtering target with better electromigration resistance and/or thermal stability.

Neither Nagano et al nor Perry et al include teaching about the hardness of the resulting sputtering target.

Pavate et al teach (see abstract and col. 3, lines 21-29) a copper alloy sputter target including 100 ppm-10 wt% of an alloying element such as Mg, Zn, Al, Fe, Ni or Si with a hardness of 100-250 HV (Vickers). Such a Vickers hardness equates to more than 40 on the Brinell hardness scale (HB).

Therefore, it would have been obvious to one of ordinary skill in the art either (1) that the alloying additions of Nagano et al would have produced the increased hardness similarly to Pavate et al (since Nagano et al also suggest using Zn, Fe or Ni as the alloying element) or (2) to have used Mg, Zn or Al as an additional alloying element in order to achieve the increased hardness of the sputtering target so that the resulting sputtering properties could be improved.

#### ***Response to Arguments***

8. Applicant's arguments filed 6 September 2007 have been fully considered but they are not persuasive. Applicant has argued that Perry et al is not prior art against the present claims.

In response, as noted above, the currently pending claims do not find support in the parent application (09/465,492), thus, Perry et al is prior art against the present claims under 35 U.S.C. 102(e)(1).

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

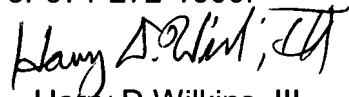
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 7:45am-4:15pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Harry D. Wilkins, III  
Primary Examiner  
Art Unit 1795

hdw